Introduction:
Cellular and molecular mechanisms, epigenetic aspects of acute clozapine poisoning are studied insufficiently. The aim of this study was to identify morphological and epigenetic alterations in brain neurons during acute exposure to clozapine combined with ethanol.

Methods:
The experiments were carried out on male Wistar rats weighting 200–250g (n=21). Group I (control) received 0.9% NaCl solution enterally; group II — clozapine 150 mg/kg in 0.9% NaCl solution; group III — clozapine 150 mg/kg in 40% ethyl alcohol. After 4 hours euthanasia was performed. Autopsy included withdrawal of brain samples for histological examination (n = 21) and for determination of global DNA methylation level (n = 21). The global DNA methylation level (5-mC%) was determined by fluorimetric method. Inter-group comparisons were made by Kruskal-Wallis test. Histological examination of paraffin sections of brains stained with hematoxylin and eosin was performed by light microscopy.

Results:
Histological examination of the cerebral cortex of animals received clozapine and clozapine with alcohol established alterations in the contours of nerve cells, neuronal hyperchromatosis and nuclear deformation, eccentric position location of the nucleoli, consolidation of Nissl bodies. Increased global DNA methylation level was found in the «clozapine+alcohol» group compared to the control group and «clozapine» group (2.56±0.3140 vs. 1.35±0.1069 and 1.70±0.3295, p <0.02).

Conclusion:
In acute clozapine poisoning and its combination with ethanol morphological changes in neurons of the cerebral cortex were detected. In acute clozapine with alcohol poisoning an increase of global DNA methylation level was observed. Probably the identified changes have a common pathogenesis which will be clarified in our further studies.